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Study shows effects of whey protein on performance

by John Schutte, AFRL Human Effectiveness Directorate

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — A glass of cold milk won't be added to pre-flight requirements for Air Force pilots, but a nutritional supplement derived from milk could become a staple of the warfighters' diet, pending the results of a new study by scientists at the Air Force Research Laboratory.

Researchers at AFRL's Human Effectiveness Directorate have partnered with GNC Corporation to determine if a specialized form of whey protein — a pure, natural, high-quality protein derived from cow's milk during the process of making cheese — can help warfighters stay strong and alert during fatigue-inducing missions.

Whey protein is popular in the physical fitness world as a supplement to boost muscle growth. It contains essential amino acids that the human body needs on a daily basis. Whey protein also contains high concentrations of numerous amino acids, which tests show enhance the process of muscle protein synthesis and muscle building. In its purest form, as whey protein isolates, it contains little to no fat, lactose or cholesterol.

Researchers want to determine the effect of this specialized whey protein on mental and physical performance of individuals subjected to long hours without sleep. Warfighters, such as aircraft pilots, crew and particularly Special Forces operators, often must remain awake for more than 24 hours during missions.

"We're asking our warfighters to do more and more physically and mentally than we ever have before and that includes fighting hard at altitude, carrying lots of weight on their backs, staying up for hours and hours on end, then doing it all over again the next day," said Col. Breck J. Lebegue, chief of aerospace medicine for AFRL/HE's Biosciences and Protection Division, Aircrew Performance and Protection Branch. "If we can find any means, any method that is safe and effective that can increase their operational capabilities, we will do that."

The project, valued at about $400,000, will begin in early 2006 at Brooks City-Base, Texas. GNC will provide the specialized whey protein and placebos, while the Air Force will provide up to 50 military members to serve as test subjects for eight weeks, along with facilities and equipment to assess and analyze results.

If researchers' theories are confirmed, the Air Force may have a non-pharmaceutical option — one that is easily and more readily available, has fewer side-effects, and carries less potential liability than amphetamines or Modafinil — to bolster strength and endurance during long-duration missions. And GNC could benefit through an enhanced commercial product line.

"We're looking for some things that are available as nutritional supplements that are not prescription or controlled drugs," said Dr. (Capt.) John M. "Andy" McQuade, chief of the Human Fatigue Neurosciences Team.

The study builds upon preliminary university research trials that show specialized whey protein can increase size and strength of certain muscle groups. The Air Force wants to test a broad variety of physical tasks and mental functions to see if this specialized whey protein can increase strength, endurance and thinking capability.

Researchers will look at the effects of the supplement on body composition and physical performance and cognitive functions, including memory and the ability to stay on task, think clearly and function normally even after 24 hours without sleep.

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This is the first clinical collaboration between the Air Force and GNC, according to Dr. Susan Trimbo, senior vice president for GNC's department of scientific affairs. The work will be performed under a cooperative research and development agreement in which participants share facilities and costs.

GNC, headquartered in Pittsburgh, Pa., is one of the world's largest suppliers of nutritional supplements, including vitamins, minerals and herbal supplements.

The relationship between AFRL and GNC grew out of Colonel Lebegue's familiarity with GNC's nutritional supplement products, which are available on select military base exchange shelves in the continental United States and some overseas locations.

"Even in deployed settings, military personnel typically use dietary supplements," Colonel Lebegue said. "I began looking around to see who might be interested in partnering, particularly from the perspective of doing careful scientific work, and we began to talk with GNC about working with us and selecting a specific product."

Cognitive tests and a modified Air Force physical fitness test will be conducted before and after test subjects ingest the compound or placebo for two months, in both an alert state and in a state of fatigue brought on by 24 hours without sleep.

To ensure objectivity, the study is a double-blind, random assignment, placebo-controlled study; that is, neither the subject nor the investigator knows if the subject is receiving a placebo or the test substance.

Colonel Lebegue and Captain McQuade are principle investigators for this study on cognitive and physical performance. **@**

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